The Past, Present, and Future of the Ballona Wetlands Ecological Reserve

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The Bay Foundation

Presentation Outline

- Importance of wetlands & loss in California
- Historic Ballona Wetlands
- Current stressors
- Monitoring and data results
- Restoration planning process

Why are wetlands important?

WETLANDS PROVIDE SERVICES

Ecosystem Services

- Biodiversity support
- Water quality improvement
- Flood abatement & erosion control
- Carbon management & sequestration

Economic Services

- Recreational benefits
- Cultural resources
- Renewable resources and commercial fishing
- Education opportunities

Additional wetland ecosystem and economic services include, but are not limited to: groundwater recharge, rare species habitats, nutrient cycling, pollution control, fish nursery areas, support of food webs & biodiversity, shelter & foraging for birds, avifauna Pacific Flyway connections, habitat value for other plants and animals, erosion resistance, air purification, moderation of temperature extremes, heavy metal retention, and many more….

Fun fact: Wetlands are giant water filters! They can remove lead, zinc, sediment, bacteria, toxins, nutrients ….

Some of the scientific literature:

Zedler and Kercher 2005, Brevik and Homburg 2004, Crooks et al. 2011, Greb et. al 2006, Clarkson et al. 2004, Kazmierczak 2001, Lin and Terry 2003, Page et al. 1997, Turner et al. 2000, Zedler 2001, Zedler and Kercher 2005

Estimates of Wetland Loss

> 50% in the United States in the last 200 years

> 90% in California

> 95% in Southern California

Sources:

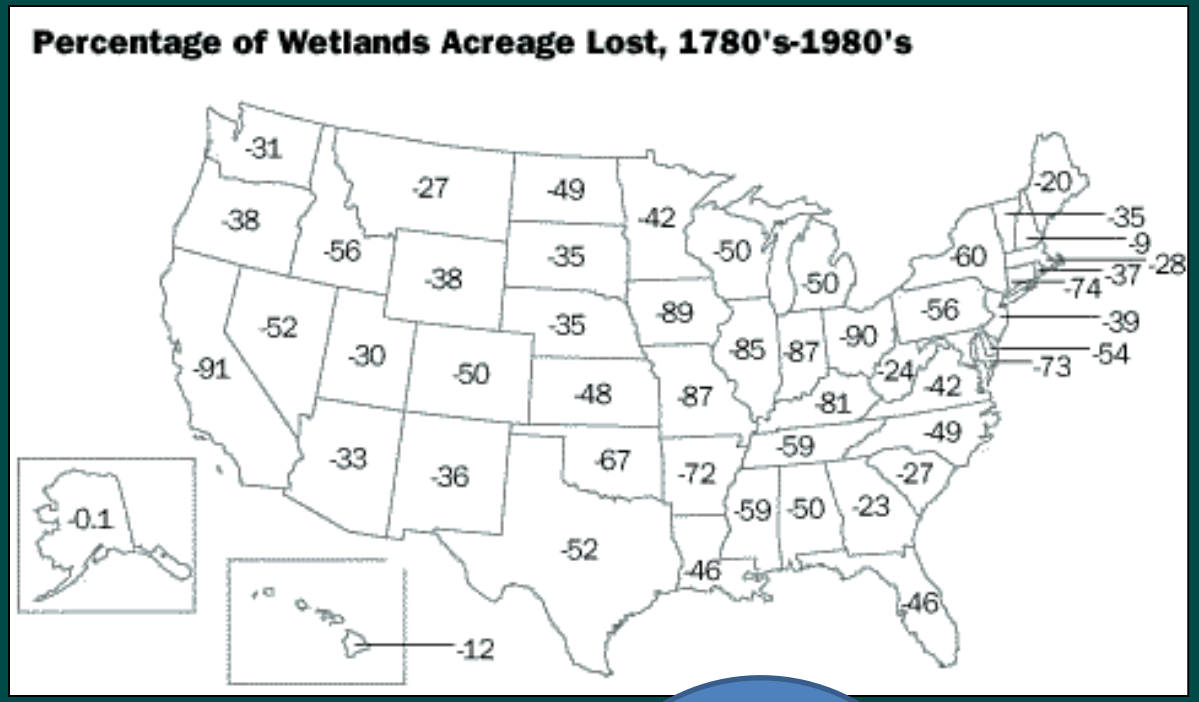
- State of the States Wetlands Report
- National Wetland Inventory
- EPA

More than one-third of the United States' threatened and endangered species live only in wetlands

Wetland Loss across the Nation

Anthropogenic Factors

- Drainage
- Dredging / channelization
- Deposition of fill material
- Diking and damming
- Tilling for crop production
- Levees
- Logging
- Mining
- Construction
- Runoff
- Air and water pollutants
- Changing nutrient levels
- Releasing toxic chemicals
- Introducing nonnative species
- Grazing by domestic animals



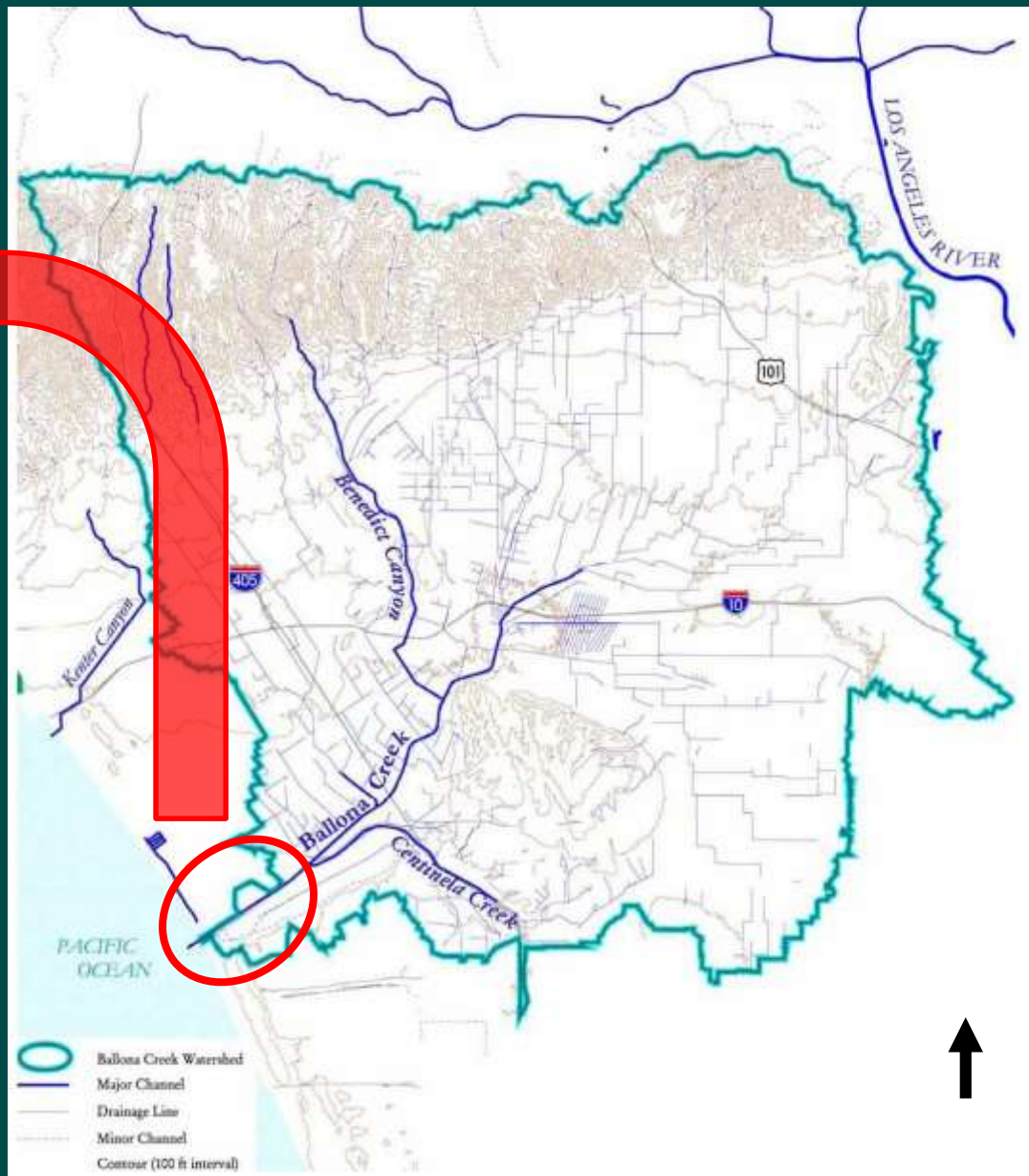
'Natural' Threats

- Erosion
- Subsidence
- Sea level rise
- Droughts
- Hurricanes and other storms

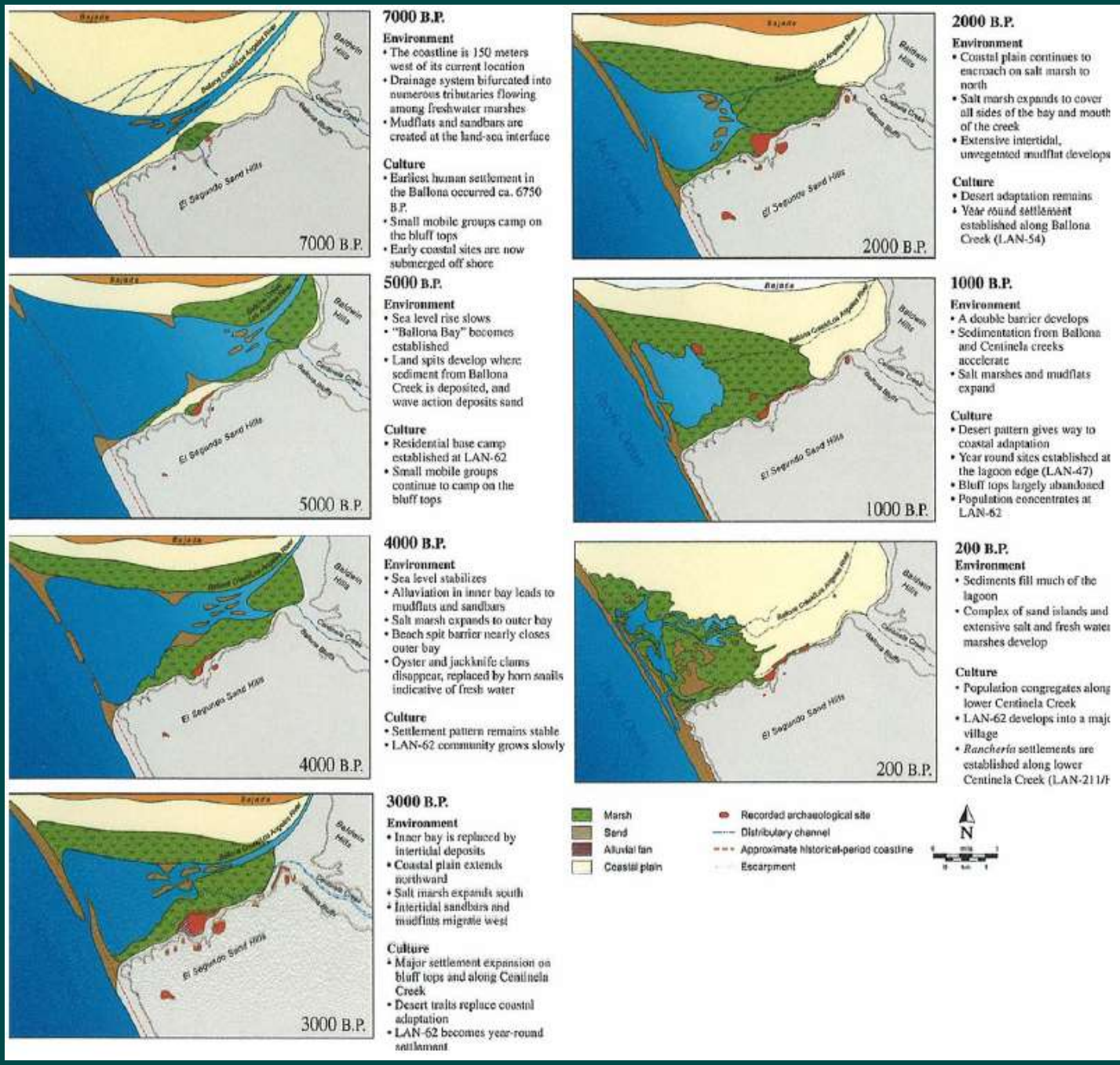
Fun fact: Wetlands are among the most productive ecosystems in the world, comparable to rain forests and coral reefs.

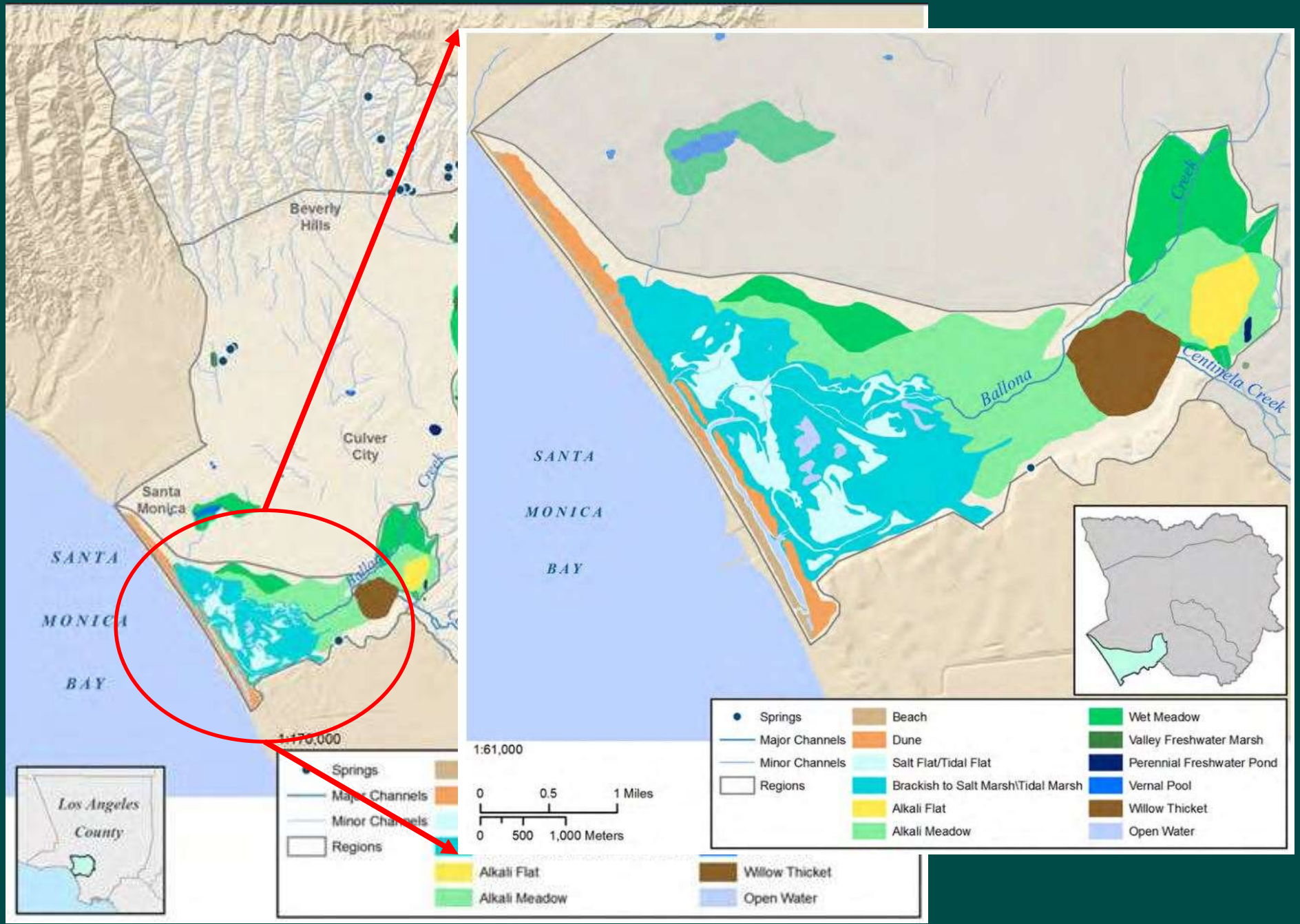

– Historic Ballona Wetlands
– Anthropogenic stressors

Our Watershed and Wetlands

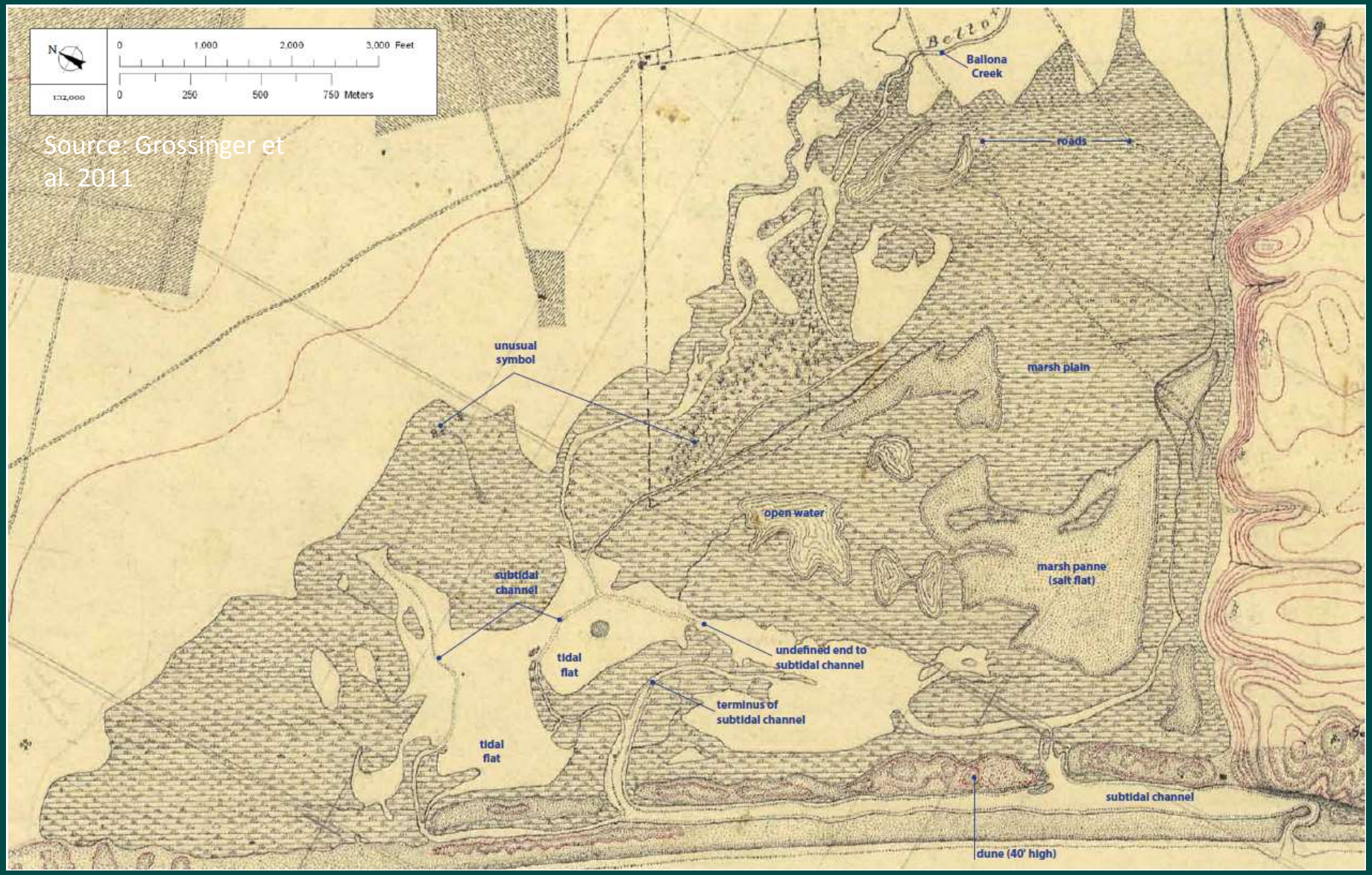


Pre-historic Ballona Wetlands




Beverly Hills
Culver City
Santa Monica
SANTA MONICA BAY
Ballona Creek
Centinela Creek
Los Angeles County
1:61,000
0 0.5 1 Miles
0 500 1,000 Meters
Springs
Major Channels
Minor Channels
Regions
Beach
Dune
Salt Flat/Tidal Flat
Brackish to Salt Marsh\Tidal Marsh
Alkali Flat
Alkali Meadow
Wet Meadow
Valley Freshwater Marsh
Perennial Freshwater Pond
Vernal Pool
Willow Thicket
Open Water

Historic Ecology – 1876 T-Sheet



Historic Ballona – 1876 T-Sheet

Marina del Rey,
1890 (LAPL)

“La Ballona”
“Ballona Lake”

Playa Del Rey,
1902 (LAPL)

View from Playa Del Rey looking North, 1927 (USC)

Marina del Rey, 1929 (LAPL)

Oil Fields

Oil derricks in Playa Del Rey, 1925 (USC)

Oil derricks in Venice, 1930 (USC)

Oil, Agriculture and Marina del Rey


Oil derricks in Venice, 1930 (USC)


Marina del Rey, 1968 (LAPL)


Celery patch, 1927 (USC)


1928 Aerial Images

1938 Aerial Images

Ballona Wetlands Ecological Reserve

- ~ 600 acres
- Largest wetland restoration project in Los Angeles County
- Owned by the state of California; managed by CDFW and CSLC as an ecological reserve
- CCC funding monitoring

CALIFORNIA DEPARTMENT FISH&GAME

CALIFORNIA STATE LANDS COMMISSION

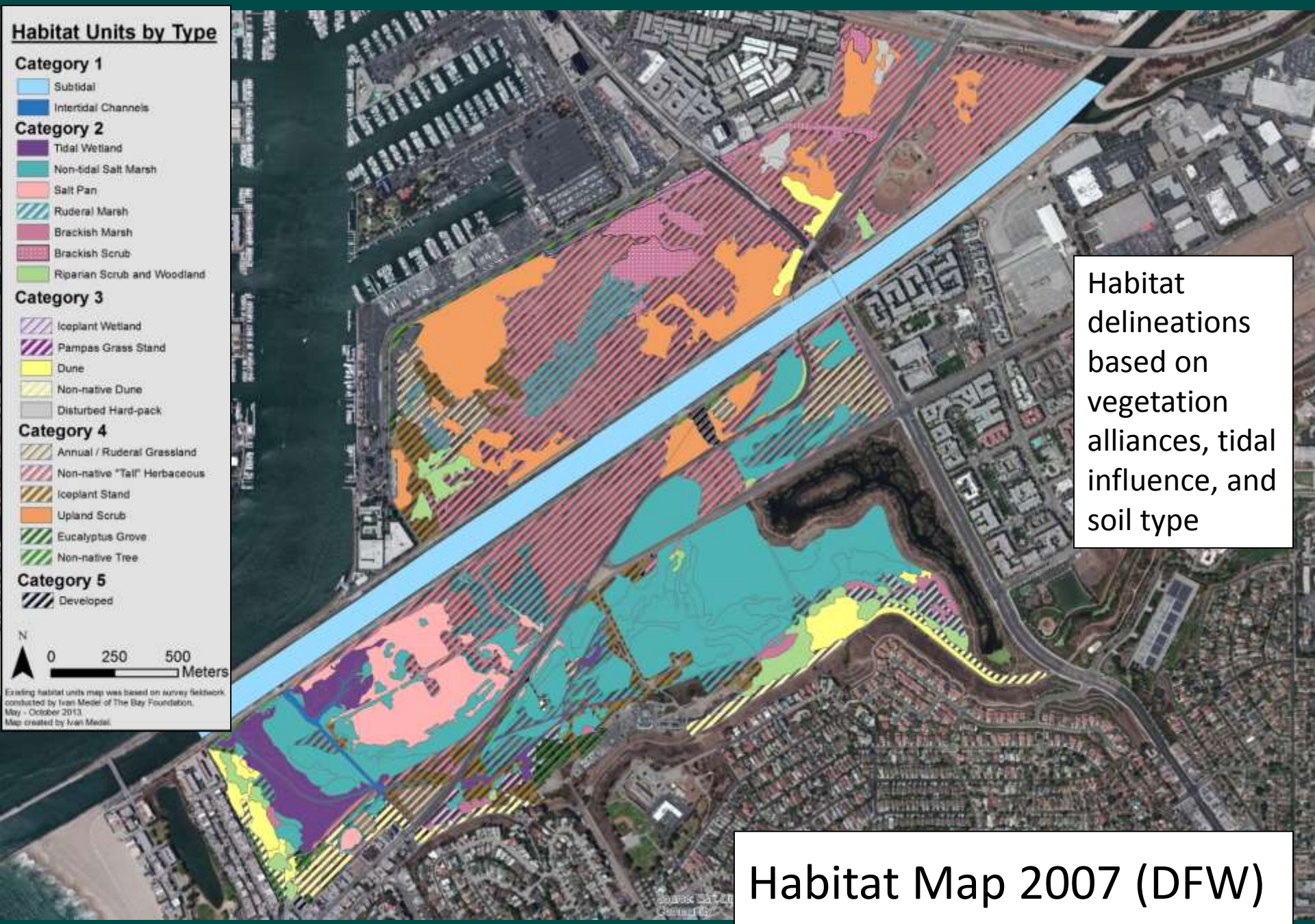
Coastal Conservancy

bay restoration commission
STEWARDS OF SANTA MONICA BAY

BWER Stressors

- Modified hydrology
  - Dredging & fill dump
  - Levees, culverts , & channelization
  - Paving & roads
  - Draining
- Water quality
  - Non-point source discharges
  - Trash
  - Heavy metal impairments
  - Bacteria and pathogen impairments
  - Other impairments
- Habitat destruction
  - Fragmentation
  - Invasive & introduced species
  - Introduced predators
  - Noise and light pollution
- Additional stressors
  - Vector control
  - Physical modifications
  - Misuse of the site
  - Sea level rise & climate change

Ballona Wetlands Today - Topography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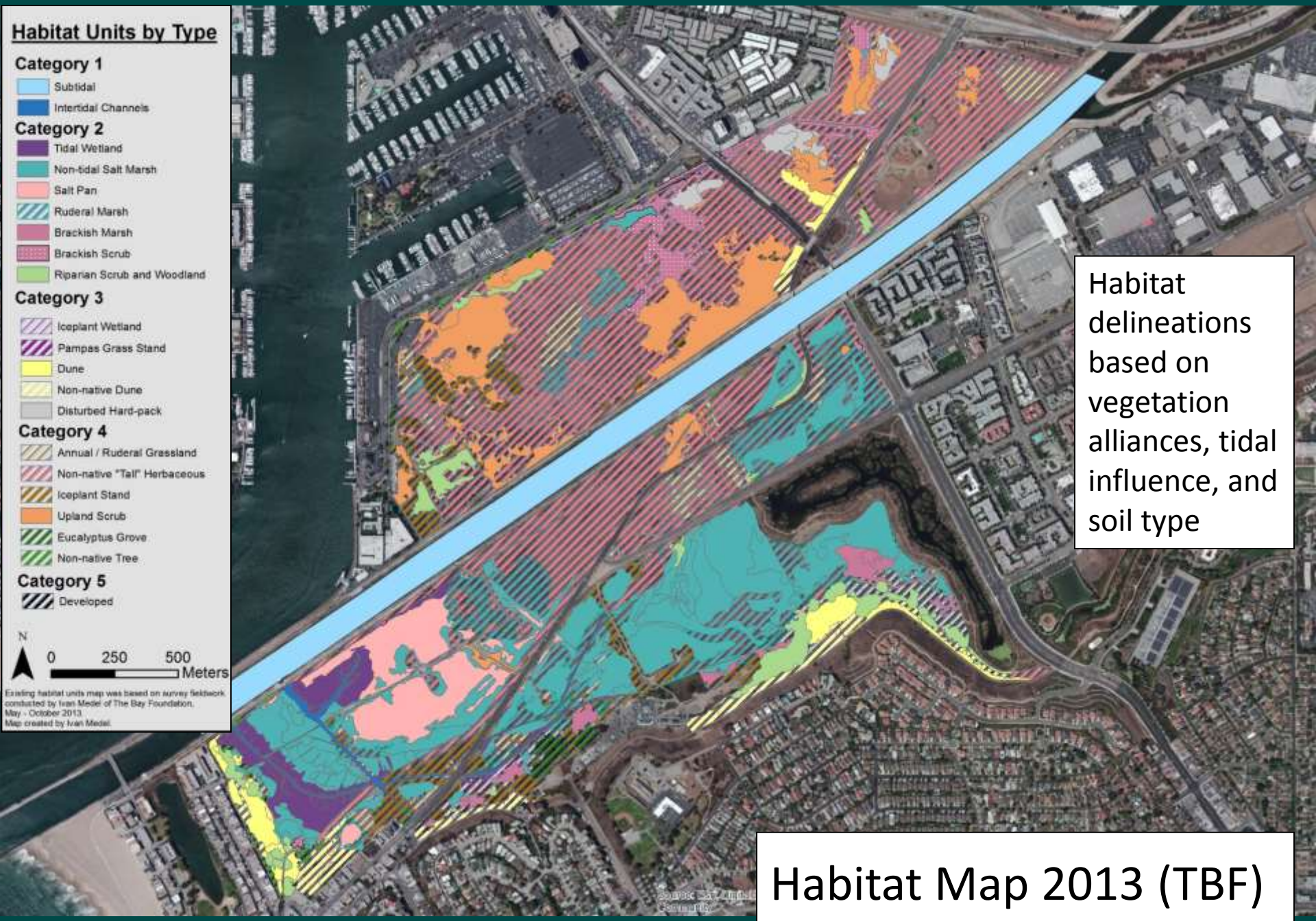
Intertidal Channels
Category 2
Tidal Wetland
Non-tidal Salt Marsh
Salt Pan
Ruderal Marsh
Brackish Marsh
Brackish Scrub
Riparian Scrub and Woodland
Category 3
Iceplant Wetland
Pampas Grass Stand
Dune
Non-native Dune
Disturbed Hard-pack
Category 4
Annual / Ruderal Grassland
Non-native "Tall" Herbaceous
Iceplant Stand
Upland Scrub
Eucalyptus Grove
Non-native Tree
Category 5
Developed
N
0
250
500
Meters
Existing habitat units map was based on survey fieldwork conducted by Ivan Medel of The Bay Foundation, May - October 2013.
Map created by Ivan Medel.
Habitat delineations based on vegetation alliances, tidal influence, and soil type
Habitat Map 2007 (DFW)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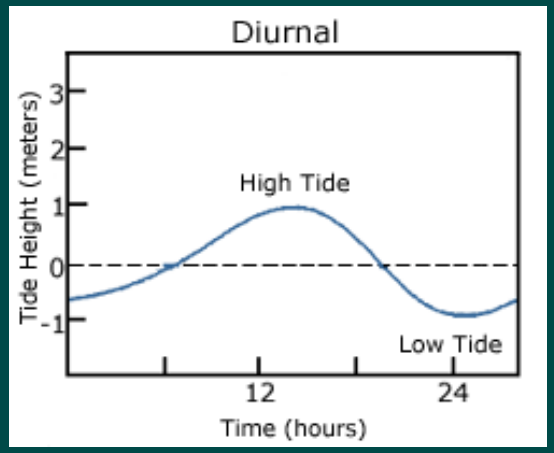
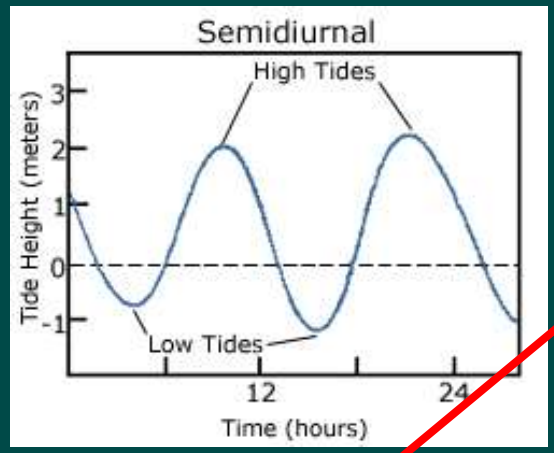
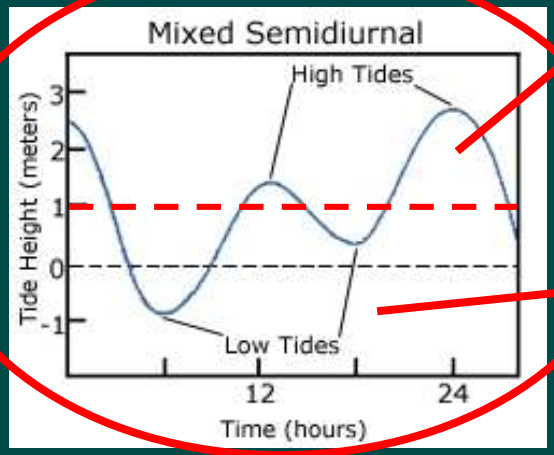
Habitat Map 2013 (TBF)

Change in acres by habitat type between 2007 and 2013

Mixed Semi-Diurnal Tide System in Southern California







dashed red line = maximum muted tide height at Ballona

Diagrams courtesy NOAA

Monitoring Report: Chapter Info

- 5 years of monitoring
- Part of EPA regional monitoring program

- **Ch. 1 Water Quality**
  - (bacteria, nutrients, trace metals, general/continuous monitoring)
- **Ch. 2 Marine Sediment**
  - (trace metals, pesticides, PCBs, etc)
- **Ch. 3 Terrestrial Soils**
  - (trace metals, organic content)
- **Ch. 4 Vegetation**
  - (stratified random transect sampling – all habitats)
- **Ch. 5 Fish**
  - (beach seines w/blocking nets, shrimp trawl, minnow traps)
- **Ch. 6 Herpetofauna**
  - (pitfall traps, coverboard arrays)
- **Ch. 7 Mammals**
  - (Sherman live traps, motion cameras)
- **Ch. 8 Birds**
  - (site-wide surveys, breeding, waterbird)
- **Ch. 9 Benthic Invertebrates**
  - (shallow & deep cores)
- **Ch. 10 Terrestrial Invertebrates**
  - (productivity metric & pitfall traps)
- **Ch. 11 Physical Characteristics**
  - (t-sect elevations, cross-sections, velocity, inundation mapping)

Example Methods: Ichthyofauna

BEACH SEINES

- 3 times annually (Sept, April, June) for 2 yrs
- beach seining at 3 stations in Fiji Ditch and 3 stations in the tidal wetlands
- blocking nets used with 5 repetitive seines at each station

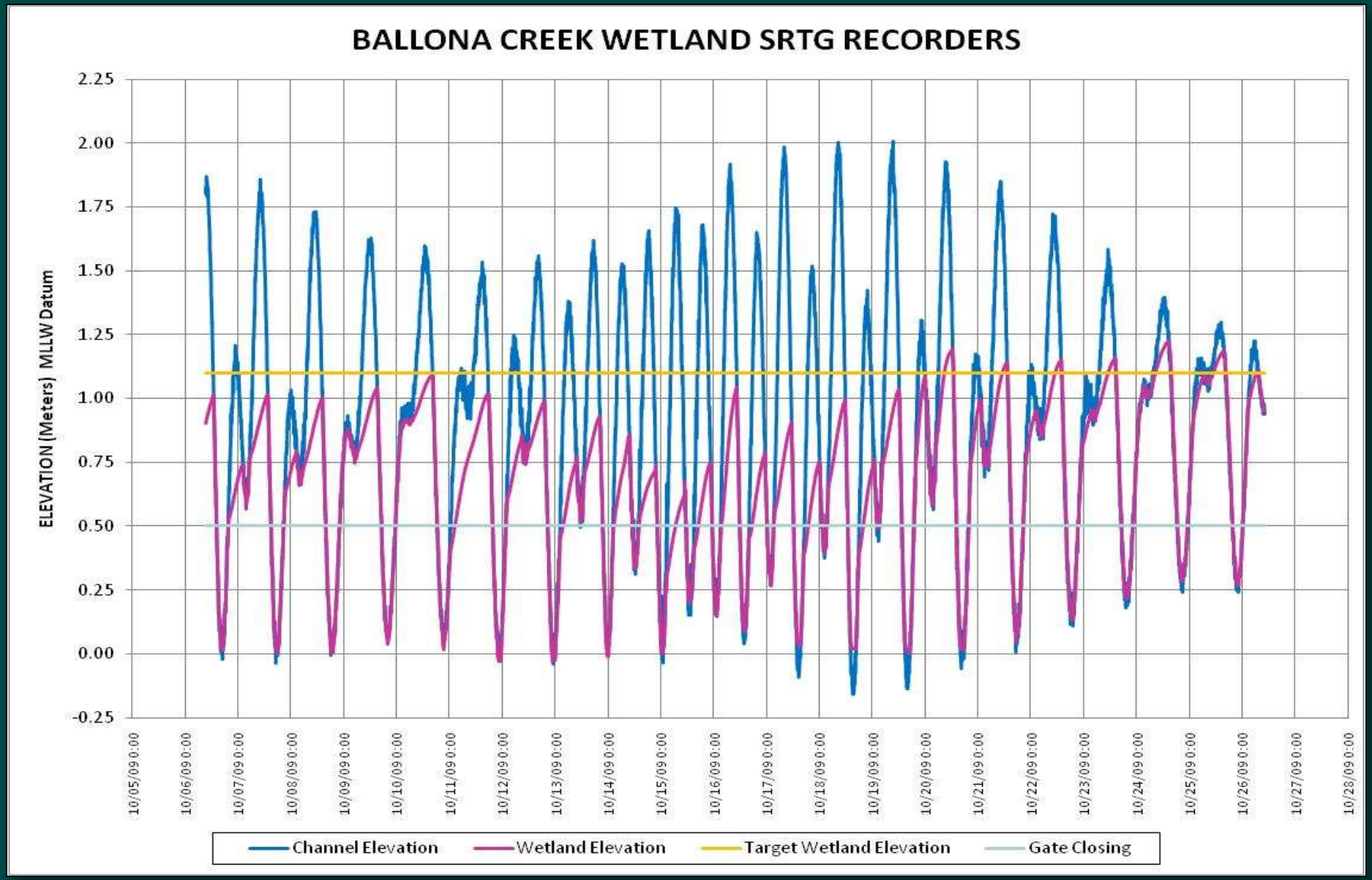
BALLONA CREEK

- shrimp trawl 5 stations in Ballona Creek: 250m

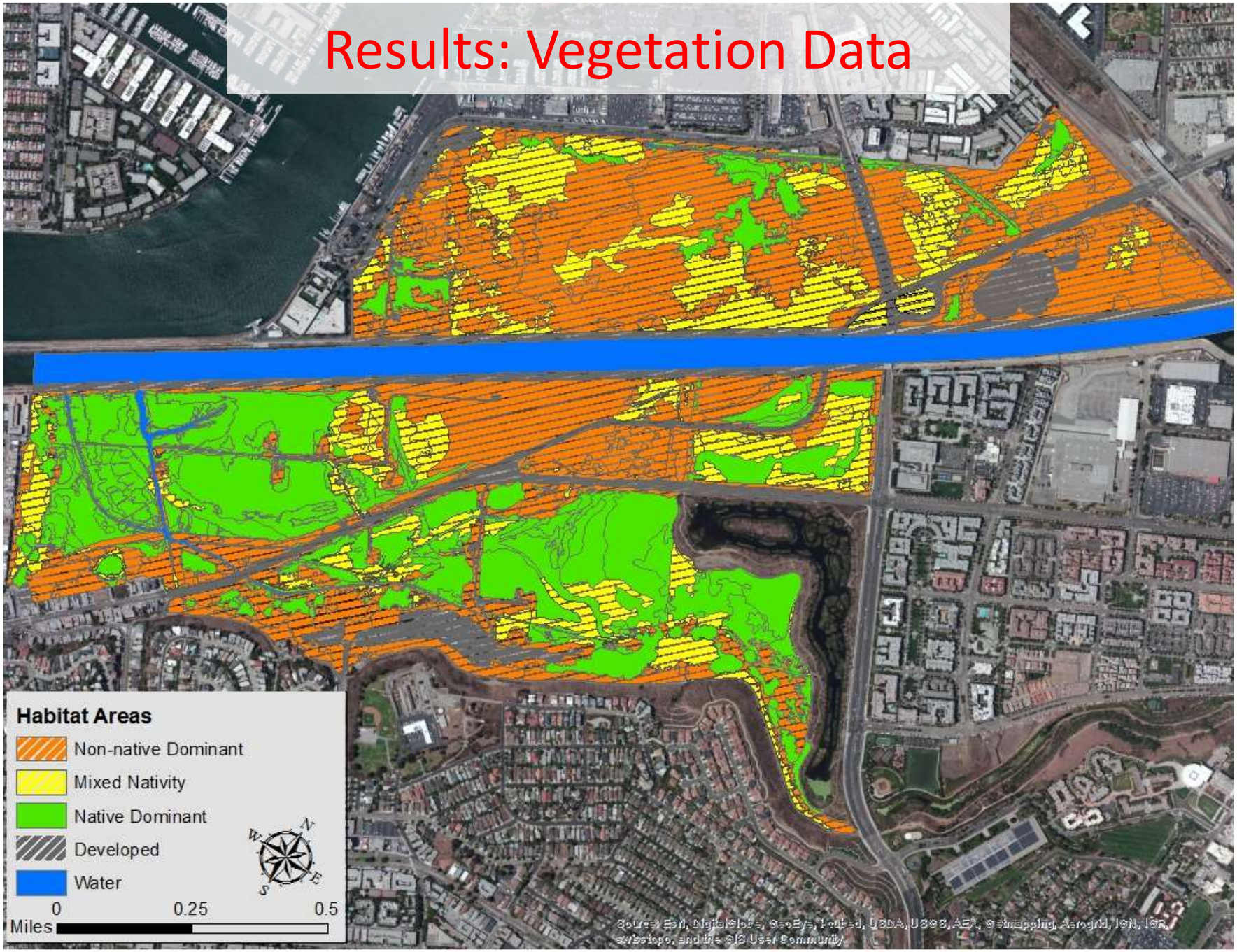
Example Methods: Benthic Invertebrates

- 3 large cores per station (left, middle, and right bank)
- 3 sets of small cores per station
- samples run through a sieve (0.5 mm for small; 2 mm for large)
- sorted by taxa in a lab

Results: Tide Gate Data (LA County)



Results: Vegetation Data



Results: Summary – Vegetation

- Marsh Habitats are typical of disturbed wetlands – high presence of invasive grasses in areas of higher elevation
  - – lower species richness than some reference locations, but mostly native species in areas with estuarine tidal influence
  - – some rare species present
- Upland Habitats are dominated by non-native species
  - – many invaders have begun to take over some of the upland habitats in recent years, including *Euphorbia*, mustard, and crown daisy
  - – some rare species present, mostly in the dune habitats

Species Results: Herpetofauna

- OVERALL RESULTS: 4 species of lizard + 4 species of snake and 1 amphibian species
- 3 lizard species captured in pitfall surveys
- 71 individuals in 544 trap nights (7.66% total capture rate)
- Confirmed presence of California legless lizard at multiple locations on site

J. Goldfarb

J. Goldfarb

J. Goldfarb

Species Results: Mammals

COMMON NAME	SCIENTIFIC NAME	STATUS	2009-2010	2010-2011	2011-2012
Botta's pocket gopher	*Thomomys bottae*	Native	V, P, I	V, I	V, I
California ground squirrel	*Spermophilus beecheyi*	Native	V, C, I	V, C, I	V, C, I
Coyote	*Canis latrans*	Native	C, I, A	V, C, I	V, C, I
Desert cottontail	*Sylvilagus audubonii*	Native	V, C, I	V, C, I	V, C, I
Domestic cat	*Felis cattus*	Non-native	V, C	V, C	V, C
Domestic dog	*Canis familiaris*	Non-native	V, C, I, A	V, C, I, A	V, C, I, A
Eastern fox squirrel	*Sciurus niger*	Non-native	V, C	V, C	V, C
House mouse	*Mus musculus*	Non-native	S	---	---
Human	*Homo sapien*	Native	V, C, I, A	V, C, I, A	V, C, I, A
Raccoon	*Procyon lotor*	Native	V, C, I	V, C, I	V, C, I
Rat (unknown species)	*Rattus* sp.	Non-native	C	C	C
South Coast marsh vole	*Microtus californicus stephensi*	Native, CSC	S	V	V
Striped skunk	*Mephitis mephitis*	Native	C	V, C	V, C
Virginia opossum	*Didelphis virginiana*	Non-native	C	V, C	V, C
Western harvest mouse	*Reithrodontomys megalotis*	Native	V, S	V, P, S	V

CRAM Comparison (averages)

BALLONA WETLANDS

Area A – highly impacted

44

Area B – seasonal wetlands; hydrological impacts

55

Area B – tide channels; muted hydrology, fewer impacts

64

LOS CERRITOS

Hellman – muted tide channels

59

Steamshovel – few impacts

71

Reference Wetlands

Upper Newport Bay	91
San Dieguito Lagoon	63
Mission Bay-Rose Creek	78

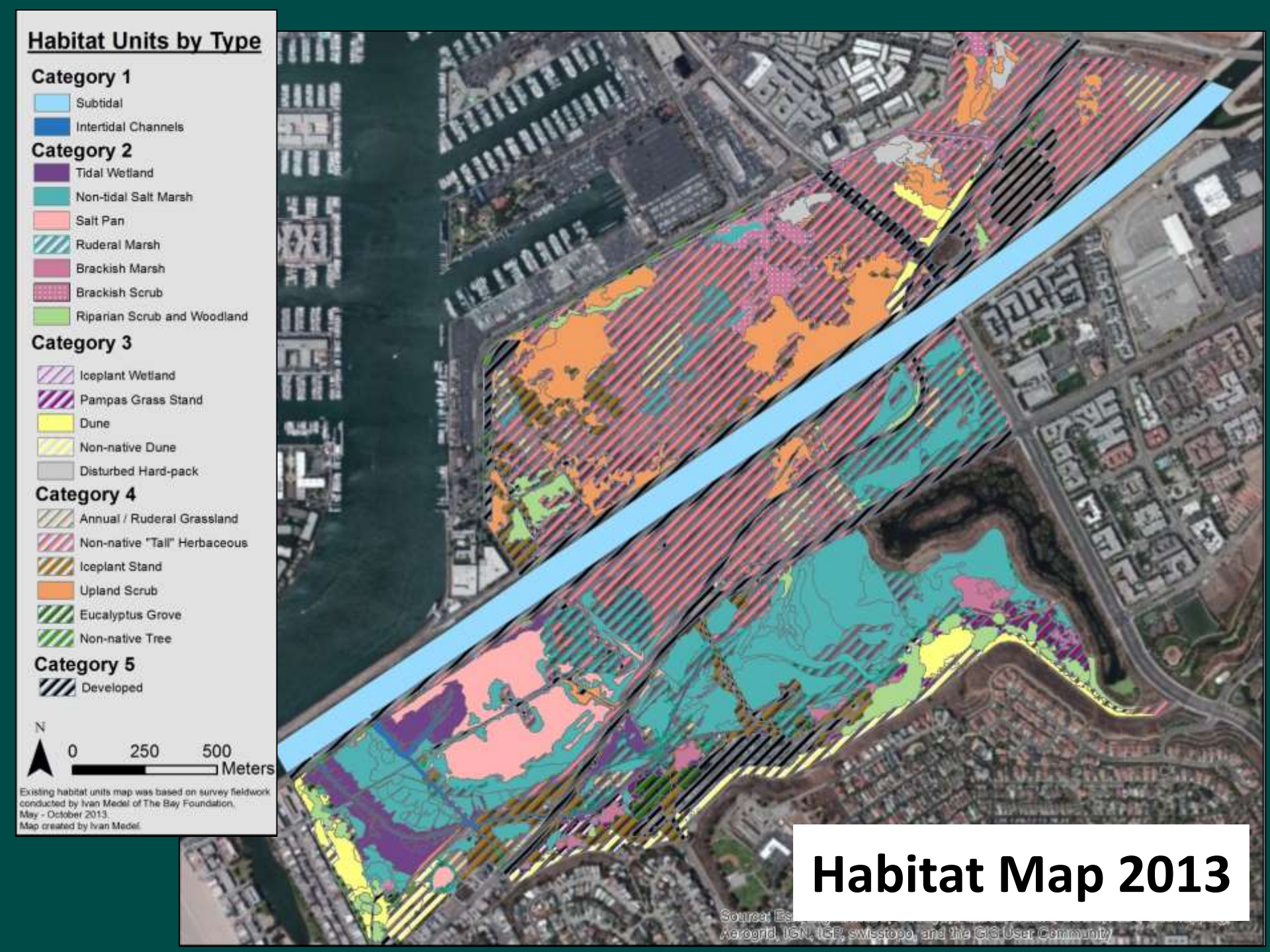
www.cramwetlands.org

Monitoring Program: Summary Conclusions

- Analyses:
  - Wetlands provided water quality filtration functions (especially for fecal indicator bacteria)
  - Non-native species predominant in upland habitats, native species dominant in salt marsh habitats; though many functions are lost and conditions are still 'degraded' or individual sps monocultures
  - Fish are fairly representative of so-Cal salt marshes, though the tidal area is small and the nursery habitat is limited
  - Significant bird use of the site (~160 species), including BSS
- Recommendations:
  - Restore tidal connections to restore ecosystem functions (e.g. water filtration, habitat connectivity, etc)
  - Increase native vegetation diversity and species richness
  - Increase the health and diversity of habitat types (especially upland); include gradual transition zones, buffer zones, and mudflat and intertidal habitats
  - Reduce habitat fragmentation
  - Remove anthropogenic impacts where possible (trash, berms, etc)

What the data from Ballona tell us:

- Degraded compared to reference /more “natural” sites
  - Lower condition scores (e.g. CRAM) and species richness, though still some native vegetation
- High level of impacts over long period of time
- Some limited functions persist (e.g. water filtration, carbon sequestration) and some missing completely
- Disproportionately high amount of vertebrate mortality along bisecting roads (e.g. Culver/Jefferson)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Map created by Ivan Medel.
Habitat Map 2013

Restoration Project Goals and Objectives

- **Goal 1: Ecosystem Restoration:** Restore, enhance, and create estuarine habitat in the Ballona Ecosystem to support a natural range of habitats and functions, especially as related to estuarine dependent plants and animals.
  - Sub-goals: Habitat, Biodiversity, Physical/Chemical Processes, Sustainability

- **Goal 2: Social and Socioeconomic Values:** Create opportunities for aesthetic, cultural, recreation, research and educational use of the Ballona Ecosystem that are compatible with area resources.
  - Sub-goals: Public Access, Cultural Access and Preservation, Recreational Use, Public Safety and Security

**** Flood management: maintain the existing level of flood protection**

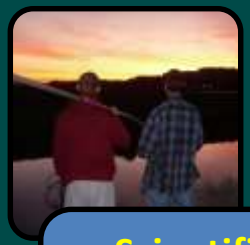
PROCESS

Saving the Land

- Community groups / activists
- Playa Vista sold to the state
- CDFW management

Designing the Future

- Scientists, community groups, agencies
- Dozens of workshops & meetings
- Developed potential plans and goals



Scientific Studies

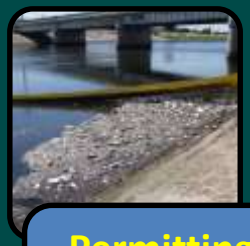
- Historical ecology
- Baseline monitoring
- Research
- Mapping
- Future climate change scenarios

Environmental Planning

- Environmental impact reports
- Hydrology studies
- Geo tech studies
- Modelling studies
- Cultural resources
- Special status species

CEQA / NEPA

- Draft reports & documents
- Public comments
- Final reports & documents



Permitting

- Flood control permits
- Army Corps
- Coastal Commission

Construction / Restoration

- May require heavy equipment
- Reconfiguring the area based on the restoration goals and final plan
- Native species
- Public access

Long-Term Monitoring

- Determine project successes
- Feed into adaptive site management
- Ecological functions
- Citizen science

Maintaining the Land

- Weeding invasive plants
- Community groups / activists
- CDFW management

Restoration Planning Process – Public Participation

Inclusive, Science-Based Process (2004-2014):

- 1 Public scoping meeting – 2012; scoping comments
- > 100 Public stakeholder meetings w/ many organizations
- 7 Science Advisory Committee Meetings
  - Many subcommittee meetings
- 9 Interim Management & Stewardship Committee Mtgs
- 11 Working Group Meetings
- 1 2-day Design Charrette, November 2006
- *Thousands of participants* throughout the process

Scientific Advisory Committee

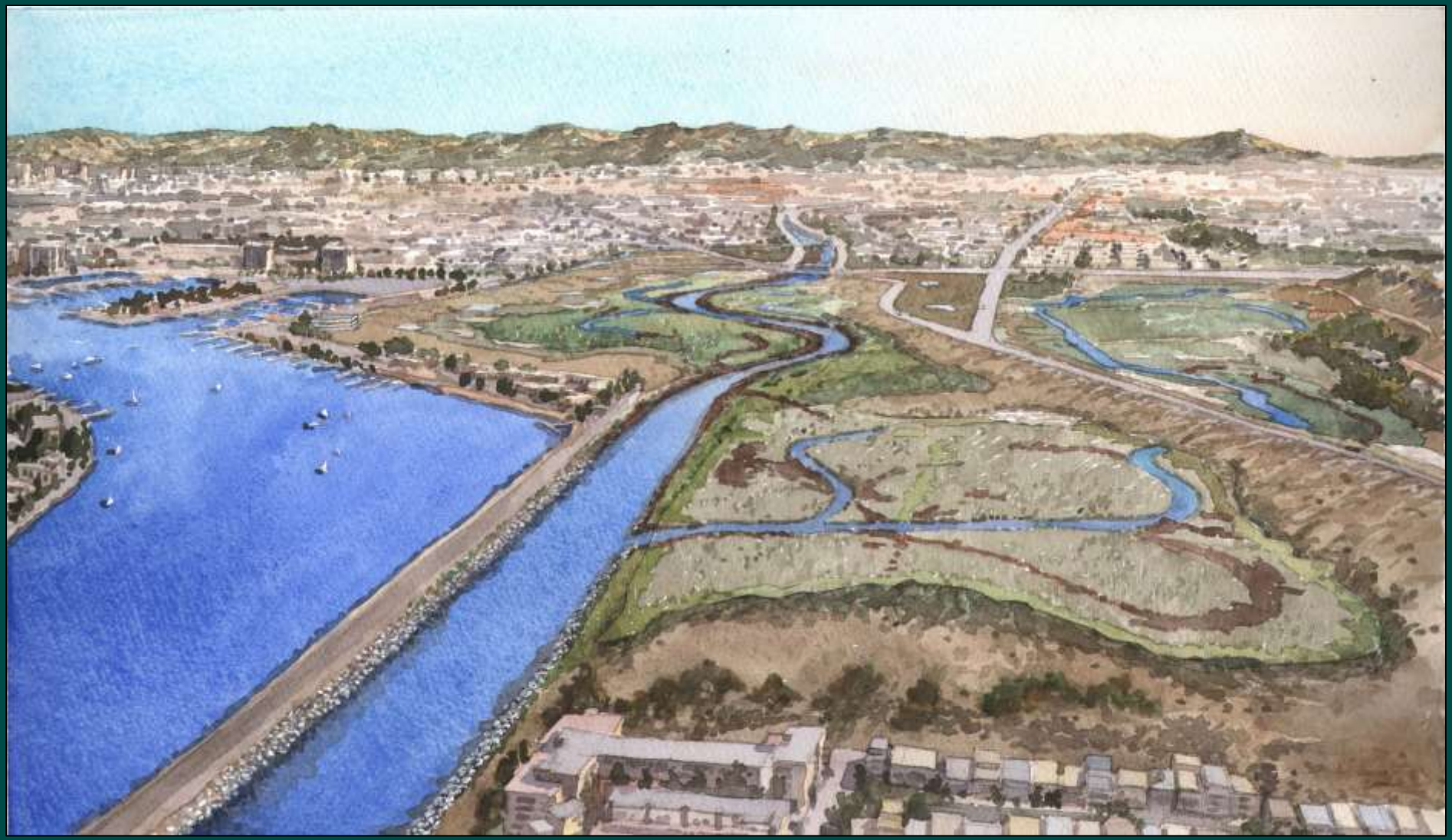
- **7 meetings, many subcommittee meetings**
- **Broad Range of Technical Expertise**
- **Subcommittee of WRP Science Advisory Panel**

Tasks –

- Identify Goals and Objectives
- Development of criteria for evaluating alternatives
- Review existing conditions (and other) reports/documents
- Review and refine feasibility assessment of preliminary alternatives
- Guidance on additional data collection and modeling
- Assist in development of alternatives

- Members – Camm Swift, Eric Stein, John Calloway, John Dixon, John Dorsey, John Largier, Joy Zedler, Ken Schwartz, Mary Small, Michael Josselyn, Phillipa Drennan, Richard Ambrose, Rick Mayfield, Robert Gearheart, Shelley Luce, Terri Stewart, Wayne Ferren, Nick Garrity

Ballona Wetlands Restoration Project
(Artistic Rendering of one possible alternative)



NEXT STEPS

Science & research components

- Finalize assessments / complete analyses
- Publish Additional Reports & Papers
- Apply science to restoration process
  - Issues and impacts that need to be further assessed
  - Adaptive management

CEQA / EIR components

- Release the draft EIR & receive public comments (Winter 2014/15)

THANKS INTERNS!








QUESTIONS?

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www.ballonarestoration.org